EEC 4230 Mobile Communication Systems

Second Semester, 2017-2018

1 Course Information

Instructor:	Dr. Hussein E. Seleem, Ph.D.
Office:	Building 1, Third floor
Text Book:	T. S. Rappaport, Wireless Communications: Principles and Practice, Prentice Hall, 2nd Edition, 2002
Additional References:	[1] A. Goldsmith, Wireless Communications, Cambridge University Press, 2009 [2] Lecture notes.
Hours/Week:	4 (Lecture) + 2 (Tutorial) + 2 hours/two weeks (Lab)
Time of Final Exam:	3 Hours
TA:	**Tutorial:** Engr. Norhan, **Lab:** Engr. Hagar

2 Course Outline:

Week	**Ch.**	**Topics**
Week 1 (5/2/2018)	1 & 2	Overview of wireless communication systems, basic concepts, major problems & challenges.
Week 2	3	Frequency reuse, channel assignment strategies, handoff strategies, interference and system capacity
Week 3 & 4	3	Trunking and Grade of Service, improving capacity; cell splitting & sectoring, cell coverage analysis.
Week 5 & 6	4	Mobile radio propagation models; path loss models, shadowing.
Week 7 & 8	5	Statistical fading models (Rayleigh, Ricean, Nakagami). Mobile channel simulations.
Week 9 (31/3/2018)		**Mid-Term Exam**
Week 10 (9/4/2018)		**Vacation**
Week 11 & 12 & 13	6 &7 & 8	Capacity of fading channels, digital modulation performance in fading channels, equalization, diversity, and channel coding techniques for mobile radio, MIMO systems.
Week 14	9 & 10	Multiple access techniques (TDMA, FDMA, CDMA, SDMA, & OFDMA), capacity of cellular systems with TDMA, FDMA, CDMA, OFDMA.
Week 15	11	Modern Wireless Systems and Standards; 1G, 2G, 3G, 4G, 5G, wireless networks, Wi-Fi, WiMAX, and LTE.
Week 16 (19/5/2018)		**Oral/Written Exam**

3 Lab

The Lab is mainly about using **MATLAB** Software to perform simulation for models described throughout the course. It will cover about ($5 \sim 6$) sessions during this semester.

4 Evaluation:

Term Work (30 Marks):
5 Marks: Tutorial Activities
5 Marks: Reports

20 Marks: Midterm Exam (9th week)

Practical/Oral Exam (30 Marks):
10 Marks: Project (Topic Proposals: 4th week, Final Report: Last lecture).
10 Marks: Oral Exam
10 Marks: Practical Exam

Final Exam (90 Marks):

5 Attendance policy:

Every student should attend at least 75% of all lectures, to be able to write Final Exam.